

Derwent WPI

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0010829549 *Drawing available*

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Specific effects providing equipment for musical instrument, modulates detected amplitude of audio signal with input sound signal

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Patent Family (1 patents, 1 countries)

| Patent Number | Kind | Date | Application Number | Kind | Date | Update | Type |
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Patent Details

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| JP 2001154674 | A | JA | 7 | 7 | |

Alerting Abstract JP A

NOVELTY - Bandpass filters (3,5) with different frequency band characteristics, extract desired frequency component of input audio and sound signals respectively. A detector (4) detects amplitude of audio signal modulated with signal output from filter (5), by modulator (6). A setting unit (8) sets-up the parameter to determine frequency band characteristics of filter (5). An adder (7) adds the signals output from the modulator.

USE - For providing special effect to audio signal from musical instrument.

ADVANTAGE - The frequency band characteristic of the bandpass filter for input sound signal is adjusted so that musical interval of output sound is changed. Hence, special effect to sound signal is provided with high efficiency.

DESCRIPTION OF DRAWINGS - The figure shows the block diagram of special effects providing equipment. (Drawing includes non-English language text).

3,5 Bandpass filters

4 Detector

6 Modulator

7 Adder

8 Setting unit

Title Terms /Index Terms/Additional Words: SPECIFIC; EFFECT; EQUIPMENT; MUSIC; INSTRUMENT; MODULATE; DETECT; AMPLITUDE; AUDIO; SIGNAL; INPUT; SOUND

Class Codes

International Patent Classification

| IPC | Class Level | Scope | Position | Status | Version Date |
|-------------|-------------|-------|----------|--------|--------------|
| G10H-001/12 | | | Main | | "Version 7" |

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CLAIMS

[Claim(s)]

[Claim 1] By inputting a sound signal and an input sound signal, and modulating said input sound signal by the amplitude envelope of said sound signal Two or more filter means are provided in the effectiveness additional equipment which adds desired effectiveness to said input sound signal. Each filter means The band pass filter for sound signals which has a different frequency band property for every filter means, and takes out the frequency band component of a request of said sound signal, The band pass filter for input sound signals which has a different frequency band property for every filter means, and takes out the frequency band component of a request of said input sound signal, An amplitude envelope detection means to detect the amplitude envelope of a sound signal from the output signal of said band pass filter for sound signals, A modulation means to modulate the output signal of said band pass filter for input sound signals by the amplitude envelope detected with said amplitude envelope detection means, A parameter setup means to provide and to set up further the parameter for determining the frequency band property of said band pass filter for input sound signals carried in said each filter means, Effectiveness additional equipment characterized by having an addition means to add the signal outputted from said modulation means carried in said each filter means.

[Claim 2] Said parameter setup means is effectiveness additional equipment according to claim 1 characterized by providing two or more parameters, making alternative selection of each parameter, and determining the frequency band property of said band pass filter for input sound signals.

[Claim 3] Said parameter setup means is effectiveness additional equipment according to claim 1 which possesses two or more parameters and an interpolation means to interpolate each parameters, carries out interpolation processing of said each parameter, and is characterized by setting up a desired parameter and determining the frequency band property of said band pass filter for input sound signals.

[Claim 4] Said input sound signal is the effectiveness additional equipment given in any 1 term of claim 1 characterized by being either of the cries of a musical instrument sound, a sound effect, and an animal - claim 3.

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DETAILED DESCRIPTION**[Detailed Description of the Invention]**

[0001]

[Field of the Invention] This invention relates to the effectiveness additional equipment which acquired effectiveness which this musical instrument has spoken by detecting the property of the sound signal which human being uttered, and modulating the signal acquired by this detecting signal from a musical instrument etc.

[0002]

[Description of the Prior Art] By modulating the musical-sound signal (input sound signal) acquired from a musical instrument with the sound signal which human being utters, while the function of electrohone is diversified in recent years, the effectiveness additional equipment which can add and output special effectiveness to a musical-sound signal is devised, and practical use is presented.

[0003] For example, if the sound of a guitar or a piano is inputted as a musical-sound signal and human being utters with "hello" toward a microphone, since a musical-sound signal which the guitar and the piano uttered with "hello" can be acquired, it is useful in the case of a live performance or recording.

[0004] Drawing 7 is the block diagram showing the configuration of the effectiveness additional equipment 101 currently used conventionally, and this effectiveness additional equipment 101 possesses two or more filter means 102 (102-1,102-2, .., 102-n) like illustration.

[0005] BPF(band pass filter) 103 for each filter means 102 to take out the signal of a desired frequency band from the sound signal inputted, The amplitude envelope detecting element 104 which detects an amplitude envelope from output-signal 103of this BPF103 a, BPF105 for having the same frequency band property as BPF103, and taking out the signal of a desired frequency band from the musical-sound signal inputted, The multiplier 106 which multiplies by amplitude envelope 104a outputted to this output-signal 105a of BPF105 from the amplitude envelope detecting element 104 is provided.

[0006] BPF103 carried in each filter means 102 (102-1 - 102-n) is set up so that frequency band properties may differ, respectively, and similarly, BPF105 carried in each filter means 102 is set up so that frequency band properties may differ, respectively. And the output signal from each filter means 102 is altogether added by the adder 107, and turns into an output signal of the effectiveness additional equipment 101 concerned. And since the signal wave form of a musical instrument sound can be modulated by the envelope of the sound signal which human being uttered according to such a configuration, an output signal will have the formant property (resonance frequency of a vocal tract) of an utterance sound, and can acquire the output signal used as a tone with which the musical instrument has talked.

[0007] Drawing 6 (a) is the explanatory view showing the example of the frequency characteristics of the formant obtained when human being utters with "****", and when "****" is inputted as a sound signal, it can acquire a formant property as shown in this drawing.

[0008] However, it sets to the effectiveness additional equipment in the above-mentioned former. BPF103 (filter for taking out a request frequency component from a sound signal) carried in each filter means 102, Since it is set up so that BPF105 (filter for taking out a desired frequency component from

an input sound signal) may serve as the same frequency band property. The frequency characteristics of the formant of an output sound cannot perform actuation of making the frequency characteristics of the formant of the sound signal to input, and the frequency of an abbreviation same next door and a formant go up and down. That is, actuation of making the formant property shown in drawing 6 (a) going up and down in accordance with a frequency shaft (axis of abscissa) cannot be performed, and the frequency characteristics (a tone, formant) of an output signal cannot be changed. For this reason, the versatility at the time of adding effectiveness to an input sound signal had the fault of being scarce.

[0009]

[Problem(s) to be Solved by the Invention] Since the frequency band property of BPF103 and BPF105 of each filter means 102 was identically set up in the conventional effectiveness additional equipment 101 as described above, requests that you did not change the musical interval of an output sound and the musical interval of an output sound wants to change somehow were mounting.

[0010] The place which it is made in order that this invention may solve such a conventional technical problem, and is made into that purpose is to offer the effectiveness additional equipment to which the musical interval of an output sound can be changed by easy actuation.

[0011]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention of a publication to this application claim 1 By inputting a sound signal and an input sound signal, and modulating said input sound signal by the amplitude envelope of said sound signal. Two or more filter means are provided in the effectiveness additional equipment which adds desired effectiveness to said input sound signal. Each filter means The band pass filter for sound signals which has a different frequency band property for every filter means, and takes out the frequency band component of a request of said sound signal, The band pass filter for input sound signals which has a different frequency band property for every filter means, and takes out the frequency band component of a request of said input sound signal, An amplitude envelope detection means to detect the amplitude envelope of a sound signal from the output signal of said band pass filter for sound signals, A modulation means to modulate the output signal of said band pass filter for input sound signals by the amplitude envelope detected with said amplitude envelope detection means, A parameter setup means to provide and to set up further the parameter for determining the frequency band property of said band pass filter for input sound signals carried in said each filter means, It is the description to have had an addition means to add the signal outputted from said modulation means carried in said each filter means.

[0012] Moreover, it is characterized by for said parameter setup means possessing two or more parameters, and for invention according to claim 2 making alternative selection of each parameter, and determining the frequency band property of said band pass filter for input sound signals.

[0013] Said parameter setup means possesses two or more parameters and a interpolation means to interpolate each parameters, and invention according to claim 3 carries out interpolation processing of said each parameter, and a desired parameter is set up and it is characterized by determining the frequency band property of said band pass filter for input sound signals. Invention according to claim 4 is characterized by said input sound signal being either of the cries of a musical instrument sound, a sound effect, and an animal.

[0014] According to this invention constituted like ****, if a sound signal is inputted, the frequency band of a request of this sound signal will be taken out with the band pass filter for sound signals (BPF3), and the envelope of the taken-out signal will be detected. On the other hand, an input of input sound signals, such as a musical instrument sound, takes out the frequency band of a request of this input sound signal with the band pass filter for input sound signals (BPF5). And it becomes irregular with the aforementioned envelope signal, and further, the modulating signal in each filter means is added with an addition means, and the output signal of BPF5 turns into an output signal of the effectiveness additional equipment concerned.

[0015] Moreover, since BPF5 can change a parameter suitably with a parameter setup means and can change this frequency band property of BPF5 by this, it can change the musical interval of the output signal of the effectiveness additional equipment concerned. Moreover, if it constitutes so that a

parameter setup means may be made to memorize two sorts of parameters and the parameter of BPF5 may be set up by interpolation processing in a interpolation means, the frequency band property of BPF5 can be changed continuously.

[0016]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained based on a drawing. Drawing 1 is the block diagram showing the configuration of 1 operation gestalt of the effectiveness additional equipment with which this invention was applied. As shown in this drawing, this effectiveness additional equipment 1 possesses two or more filter means 2 (2-1, 2-2, ..., 2-n) (for example, $n=18$).

[0017] BPF(band pass filter for sound signals) 3 for each filter means 2 to take out the signal of a desired frequency band from the sound signal inputted (3-1 - 3-n), The amplitude envelope detecting element 4 (4-1 - 4-n) which detects an amplitude envelope from output-signal 3 of this BPF3 a (3a-1 - 3 a-n), BPF(band pass filter for input sound signals) 5 for having the same frequency band property as BPF3, and taking out the signal of a desired frequency band from the musical-sound signal (input sound signal) inputted (5-1 - 5-n), The multiplier (modulation means) 6 (6-1 - 6-n) which multiplies by amplitude envelope 4a (4a-1 - 4 a-n) outputted to output-signal 5a (5a-1 - 5 a-n) of BPF5 from the amplitude envelope detection means 4 is provided.

[0018] Moreover, BPF3 (3-1 - 3-n) carried in each filter means 2 (2-1 - 2-n) is set up so that frequency bands may differ, respectively, and similarly, BPF5 (5-1 - 5-n) is set up so that frequency bands may differ, respectively. And the parameter setup section (parameter setup means) 8 which changes suitably the parameter which determines this frequency band property of BPF5 is connected to BPF5 (BPF for input sound signals). Furthermore, the output signal from each filter means 2 is altogether added by the adder (addition means) 7, and turns into an output signal of the effectiveness additional equipment 1 concerned.

[0019] Drawing 2 is the explanatory view showing the concrete configuration of BPF5, and as shown in this drawing, this BPF5 possesses four delay elements 11 and five coefficient multipliers 12 which have multipliers a_0 , a_1 , a_2 , b_1 , and b_2 , respectively. And the frequency characteristics of BPF5 can be changed as everyone knows by changing each multipliers a_0 , a_1 , a_2 , b_1 , and b_2 (henceforth [these multipliers are named generically and] a parameter). That is, in the above-mentioned parameter setup section 8, the frequency band property of BPF5 is suitably changed by performing processing to which this parameter (a_0 , a_1 , a_2 , b_1 , b_2) is changed.

[0020] Drawing 3 is the block diagram showing the concrete configuration of the parameter setup section 8. As shown in this drawing, this parameter setup section 8 The parameter storage section 13 which memorizes the parameter of BPF5 (5-1 - 5-n) carried in each filter means 2 (2-1 - 2-n) shown in drawing 1 is provided. In this parameter storage section 13 Two sorts of parameters of the 2nd parameter $P1-2-Pn-2$ and ** are remembered to be the 1st parameter $P1-1-Pn-1$. That is, two sorts of parameter $P1-1$ and $P1-2$ are memorized to BPF 5-1, two sorts of parameter $P2-1$ and $P2-2$ are memorized to BPF 5-2, and two sorts of parameters are memorized to each BPF5 like the following.

[0021] And if the 1st parameter $P1-1-Pn-1$ determines said multiplier (multiplier shown in drawing 2) of BPF5 (5-1 - 5-n) If it is set up so that it may become the frequency band property as the frequency band property of BPF3 shown in drawing 1 that this BPF5 is the same, and the 2nd parameter $P1-2-Pn-2$ determines the multiplier of BPF5 (5-1 - 5-n) BPF5 is set up so that it may become a frequency band property used as the max at the time of changing the frequency band property concerned of BPF5.

[0022] This is explained based on drawing 4 . Drawing 4 (a) the property Fig. and this drawing (b) showing the frequency band of BPF3 (3-1 - 3-n) carried in each filter means 2 (2-1 - 2-n) The property Fig. and this drawing (c) showing the frequency band when setting the parameter of BPF5 (5-1 - 5-n) carried in each filter means 2 (2-1 - 2-n) as the 1st parameter are a property Fig. showing the frequency band when setting it as this 2nd parameter. Drawing 4 (a) When it is set as the 1st parameter so that I may be understood from - (c), the frequency band property of BPF3 and the frequency band property of BPF5 are in agreement, and when it is set as the 2nd parameter, the frequency band property of BPF5 will be set as the band which serves as a high frequency to the frequency band property of BPF3.

[0023] As shown in drawing 3, moreover, the parameter setup section 8 The parameter interpolation section 14 is provided. This parameter interpolation section 14 Based on the 1st parameter (P1-1-Pn-1) and 2nd parameter (P1-2-Pn-2) which were memorized by the parameter storage section 13, by performing linear interpolation processing The parameter used as the mean value of the 1st parameter and the 2nd parameter can be set up suitably. In addition, interpolation processing here is not limited to linear interpolation.

[0024] Drawing 5 is the block diagram showing the concrete configuration of the parameter interpolation section 14, and this parameter interpolation section 14 obtains the parameter output used as these mean values like illustration by providing Multipliers 14a and 14b and Adders 14c and 14d, and carrying out linear interpolation processing of the 1st parameter (P1-1-Pn-1) and 2nd parameter (P1-2-Pn-2). That is, if the interpolation parameter shown in drawing 5 is adjusted in "0" to "1", the parameter output obtained by interpolation processing will change suitably between the 1st parameter and the 2nd parameter. If it puts in another way, it can be made to move between the band which shows the frequency band property of BPF5 to drawing 4 (b), and the band shown in this drawing (c) (frequencies fL1 and fL2, the range of ..).

[0025] Next, actuation of the effectiveness additional equipment 1 concerning this operation gestalt constituted as mentioned above is explained. First, if the interpolation parameter shown in drawing 5 is set to "0" as initial setting, the parameter output from the parameter interpolation section 14 will be set to the 1st parameter P1-1-Pn-1, and the frequency band property of BPF5 (5-1 - 5-n) will be determined by this parameter. That is, the frequency band property of BPF5 (5-1 - 5-n) becomes the same as that of the frequency band property of BPF3 (3-1 - 3-n) so that I may be understood from drawing 4 (a) and (b).

[0026] In this condition, if a sound signal and a musical-sound signal (input sound signal) are inputted into the effectiveness additional equipment 1 (refer to drawing 1) concerned, the signal of a desired frequency band will be taken out by BPF3 (3-1 - 3-n) of each filter means 2 (2-1 - 2-n). Since this output-signal 3a (3a-1 - 3 a-n) is supplied to the amplitude envelope detection means 4 (4-1 - 4-n), from this amplitude envelope detection means 4, amplitude envelope 4a (4a-1 - 4 a-n) is outputted.

[0027] Moreover, since a musical-sound signal is inputted into BPF5 (5-1 - 5-n), the signal of a desired frequency band is taken out by this BPF5 as output signal 5a (5a-1 - 5 a-n). And since it can multiply by this output-signal 5a and amplitude envelope 4a mutually with a multiplier 6 (6-1 - 6-n), output-signal 6a (6a-1 - 6 a-n) of this multiplier 6 becomes the wave which modulated the musical-sound signal by the amplitude envelope of a sound signal.

[0028] Since addition processing of the output signal 6a obtained with each filter means 2 (2-1 - 2-n) is carried out with an adder 7, the signal outputted from this adder 7 serves as a wave of the musical-sound signal which has the formant of a sound signal, and an output signal as if the musical instrument had talked can be acquired. For example, if a guitar sound is inputted as a musical-sound signal and "hello" is inputted as a sound signal, an output signal which the guitar has spoken with "hello" can be acquired.

[0029] Subsequently, when the interpolation parameter shown in drawing 5 is changed, the frequency band property of BPF5 (5-1 - 5-n) will move in the direction where a frequency is high, as shown in drawing 4 (c) (if the interpolation parameter set as "0" is brought close to "1"). Thereby, the signal outputted from each filter means 2 (2-1 - 2-n) changes so that it may become a respectively higher frequency band.

[0030] The interpolation parameter of the parameter interpolation section 14 shown in drawing 5 by adjusting suitably between "0" and "1" namely, the output signal of the parameter interpolation section 14 Changing between the 1st parameter P1-1-Pn-1 and the 2nd parameter P1-2-Pn-2, the frequency band property of BPF5 (5-1 - 5-n) moves between the band shown in drawing 4 (b), and the bands shown in this drawing (c) (frequencies fL1 and fL2, the range of ..). Therefore, as shown in this drawing (b), a frequency moves the frequency of a formant as shown in drawing 6 (a), and the formant added to the output sound becomes high.

[0031] Consequently, a tone which the guitar has spoken with "hello" can be made to output, and this formant can be changed now.

[0032] Thus, according to the effectiveness additional equipment 1 concerning this operation gestalt, a tone which the musical instrument (a guitar and piano) has spoken can be obtained by inputting the voice input signal by utterance of human being, and a musical-sound signal (input sound signal). Furthermore, since the frequency of the formant of an output signal can be made to go up and down by changing suitably the interpolation parameter in the parameter interpolation section 14, the formant added to an output signal can be changed and effectiveness attached processing which is more rich in versatility as compared with the former becomes possible.

[0033] In addition, although the above-mentioned operation gestalt explained the example which sets two sorts of parameters, the 1st parameter and the 2nd parameter, as the parameter storage section 13, and sets the parameter of BPF5 (5-1 - 5-n) as it by interpolation processing based on each of these parameters It is also possible by not limiting this invention to this, memorizing two or more sorts of parameters in the parameter storage section 13, and not performing interpolation processing, but choosing a desired parameter by change-over actuation to constitute so that the frequency of the formant of an output signal may be made to go up and down.

[0034] Moreover, although the above-mentioned operation gestalt explained musical-sound signals, such as a guitar and a piano, to the example as an input sound signal, it is also possible for this invention not to be limited to this and to consider as a sound effect, the cry of an animal, etc.

[0035]

[Effect of the Invention] As explained above, since the effectiveness additional equipment of this invention can adjust suitably the frequency band property of the band pass filter for input sound signals (BPF5), it can change the musical interval of an output sound. Moreover, if the parameter storage means is made to memorize two sorts of parameters and the parameter of BPF5 is set up for a parameter by interpolation processing based on these parameters, the frequency band property of BPF5 can be changed continuously, and various effectiveness attached processing will become possible.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the effectiveness additional equipment which acquired effectiveness which this musical instrument has spoken by detecting the property of the sound signal which human being uttered, and modulating the signal acquired by this detecting signal from a musical instrument etc.

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PRIOR ART

[Description of the Prior Art] By modulating the musical-sound signal (input sound signal) acquired from a musical instrument with the sound signal which human being utters, while the function of electrohone is diversified in recent years, the effectiveness additional equipment which can add and output special effectiveness to a musical-sound signal is devised, and practical use is presented.

[0003] For example, if the sound of a guitar or a piano is inputted as a musical-sound signal and human being utters with "hello" toward a microphone, since a musical-sound signal which the guitar and the piano uttered with "hello" can be acquired, it is useful in the case of a live performance or recording.

[0004] Drawing 7 is the block diagram showing the configuration of the effectiveness additional equipment 101 currently used conventionally, and this effectiveness additional equipment 101 possesses two or more filter means 102 (102-1, 102-2, ..., 102-n) like illustration.

[0005] BPF (band pass filter) 103 for each filter means 102 to take out the signal of a desired frequency band from the sound signal inputted, The amplitude envelope detecting element 104 which detects an amplitude envelope from output-signal 103 of this BPF 103, a BPF 105 for having the same frequency band property as BPF 103, and taking out the signal of a desired frequency band from the musical-sound signal inputted, The multiplier 106 which multiplies by amplitude envelope 104a outputted to this output-signal 105a of BPF 105 from the amplitude envelope detecting element 104 is provided.

[0006] BPF 103 carried in each filter means 102 (102-1 - 102-n) is set up so that frequency band properties may differ, respectively, and similarly, BPF 105 carried in each filter means 102 is set up so that frequency band properties may differ, respectively. And the output signal from each filter means 102 is altogether added by the adder 107, and turns into an output signal of the effectiveness additional equipment 101 concerned. And since the signal wave form of a musical instrument sound can be modulated by the envelope of the sound signal which human being uttered according to such a configuration, an output signal will have the formant property (resonance frequency of a vocal tract) of an utterance sound, and can acquire the output signal used as a tone with which the musical instrument has talked.

[0007] Drawing 6 (a) is the explanatory view showing the example of the frequency characteristics of the formant obtained when human being utters with "***", and when "***" is inputted as a sound signal, it can acquire a formant property as shown in this drawing.

[0008] However, it sets to the effectiveness additional equipment in the above-mentioned former. BPF 103 (filter for taking out a request frequency component from a sound signal) carried in each filter means 102, Since it is set up so that BPF 105 (filter for taking out a desired frequency component from an input sound signal) may serve as the same frequency band property The frequency characteristics of the formant of an output sound cannot perform actuation of making the frequency characteristics of the formant of the sound signal to input, and the frequency of an abbreviation same next door and a formant go up and down. That is, actuation of making the formant property shown in drawing 6 (a) going up and down in accordance with a frequency shaft (axis of abscissa) cannot be performed, and the frequency characteristics (a tone, formant) of an output signal cannot be changed. For this reason, the versatility at the time of adding effectiveness to an input sound signal had the fault of being scarce.

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EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, since the effectiveness additional equipment of this invention can adjust suitably the frequency band property of the band pass filter for input sound signals (BPF5), it can change the musical interval of an output sound. Moreover, if the parameter storage means is made to memorize two sorts of parameters and the parameter of BPF5 is set up for a parameter by interpolation processing based on these parameters, the frequency band property of BPF5 can be changed continuously, and various effectiveness attached processing will become possible.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Since the frequency band property of BPF103 and BPF105 of each filter means 102 was identically set up in the conventional effectiveness additional equipment 101 as described above, requests that you did not change the musical interval of an output sound and the musical interval of an output sound wants to change somehow were mounting.

[0010] The place which it is made in order that this invention may solve such a conventional technical problem, and is made into that purpose is to offer the effectiveness additional equipment to which the musical interval of an output sound can be changed by easy actuation.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention of a publication to this application claim 1 By inputting a sound signal and an input sound signal, and modulating said input sound signal by the amplitude envelope of said sound signal Two or more filter means are provided in the effectiveness additional equipment which adds desired effectiveness to said input sound signal. Each filter means The band pass filter for sound signals which has a different frequency band property for every filter means, and takes out the frequency band component of a request of said sound signal, The band pass filter for input sound signals which has a different frequency band property for every filter means, and takes out the frequency band component of a request of said input sound signal, An amplitude envelope detection means to detect the amplitude envelope of a sound signal from the output signal of said band pass filter for sound signals, A modulation means to modulate the output signal of said band pass filter for input sound signals by the amplitude envelope detected with said amplitude envelope detection means, A parameter setup means to provide and to set up further the parameter for determining the frequency band property of said band pass filter for input sound signals carried in said each filter means, It is the description to have had an addition means to add the signal outputted from said modulation means carried in said each filter means.

[0012] Moreover, it is characterized by for said parameter setup means possessing two or more parameters, and for invention according to claim 2 making alternative selection of each parameter, and determining the frequency band property of said band pass filter for input sound signals.

[0013] Said parameter setup means possesses two or more parameters and a interpolation means to interpolate each parameters, and invention according to claim 3 carries out interpolation processing of said each parameter, and a desired parameter is set up and it is characterized by determining the frequency band property of said band pass filter for input sound signals. Invention according to claim 4 is characterized by said input sound signal being either of the cries of a musical instrument sound, a sound effect, and an animal.

[0014] According to this invention constituted like ****, if a sound signal is inputted, the frequency band of a request of this sound signal will be taken out with the band pass filter for sound signals (BPF3), and the envelope of the taken-out signal will be detected. On the other hand, an input of input sound signals, such as a musical instrument sound, takes out the frequency band of a request of this input sound signal with the band pass filter for input sound signals (BPF5). And it becomes irregular with the aforementioned envelope signal, and further, the modulating signal in each filter means is added with an addition means, and the output signal of BPF5 turns into an output signal of the effectiveness additional equipment concerned.

[0015] Moreover, since BPF5 can change a parameter suitably with a parameter setup means and can change this frequency band property of BPF5 by this, it can change the musical interval of the output signal of the effectiveness additional equipment concerned. Moreover, if it constitutes so that a parameter setup means may be made to memorize two sorts of parameters and the parameter of BPF5 may be set up by interpolation processing in a interpolation means, the frequency band property of BPF5 can be changed continuously.

[0016]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained based on a drawing. Drawing 1 is the block diagram showing the configuration of 1 operation gestalt of the effectiveness additional equipment with which this invention was applied. As shown in this drawing, this effectiveness additional equipment 1 possesses two or more filter means 2 (2-1, 2-2, ..., 2-n) (for example, $n=18$).

[0017] BPF(band pass filter for sound signals) 3 for each filter means 2 to take out the signal of a desired frequency band from the sound signal inputted (3-1 - 3-n), The amplitude envelope detecting element 4 (4-1 - 4-n) which detects an amplitude envelope from output-signal 3 of this BPF3 a (3a-1 - 3a-n), BPF(band pass filter for input sound signals) 5 for having the same frequency band property as BPF3, and taking out the signal of a desired frequency band from the musical-sound signal (input sound signal) inputted (5-1 - 5-n), The multiplier which multiplies by amplitude envelope 4a (4a-1 - 4a-n) outputted to output-signal 5a (5a-1 - 5a-n) of BPF5 from the amplitude envelope detection means 4

[Translation done.]

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- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS**[Brief Description of the Drawings]**

[Drawing 1] It is the block diagram showing the configuration of the effectiveness additional equipment concerning 1 operation gestalt of this invention.

[Drawing 2] It is the explanatory view showing the concrete configuration of a band pass filter.

[Drawing 3] It is the block diagram showing the detailed configuration of the parameter setup section.

[Drawing 4] It is the explanatory view showing the band property of BPF3 and BPF5, and, for BPF3 and (b), BPF5 (when the 1st parameter is chosen) and (c) are [(a)] BPF5 (the case where the 2nd parameter is chosen is shown, respectively.).

[Drawing 5] It is the explanatory view showing the detailed configuration of the parameter interpolation section.

[Drawing 6] It is the explanatory view showing the frequency characteristics of the formant when uttering with "***", and (a) shows the time of (b) setting up the 2nd parameter, when it is set as the 1st parameter.

[Drawing 7] It is the block diagram showing the configuration of the effectiveness additional equipment in the former.

[Description of Notations]

1 Effectiveness Additional Equipment

2 (2-1 - 2-n) Filter means

3 (3-1 - 3-n) BPF (band pass filter for sound signals)

4 (4-1 - 4-n) Amplitude envelope detecting element (amplitude envelope detection means)

5 (5-1 - 5-n) BPF (band pass filter for input sound signals)

6 (6-1 - 6-n) Multiplier (modulation means)

7 Adder (Addition Means)

8 Parameter Setup Section (Parameter Setup Means)

11 Delay Element

12 Coefficient Multiplier

13 Parameter Storage Section

14 Parameter Interpolation Section

14a, 14b Multiplier

14c, 14d Adder

[Translation done.]

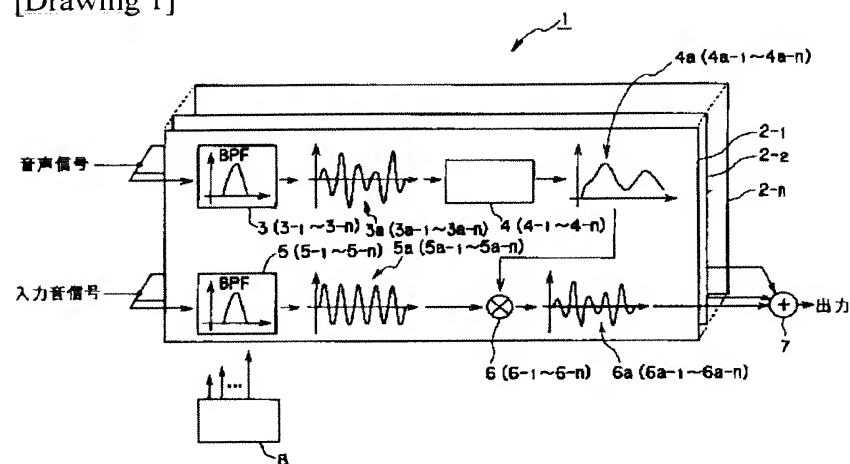
* NOTICES *

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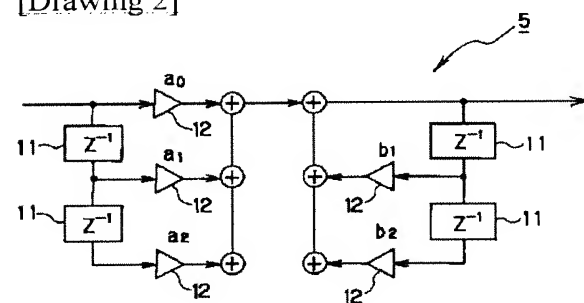
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

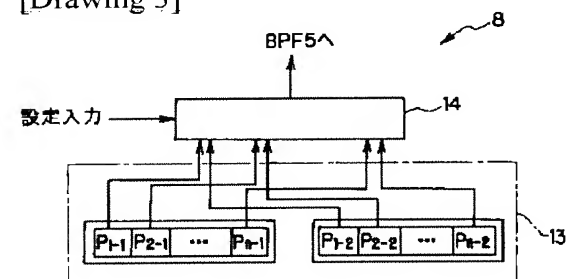
[Drawing 1]



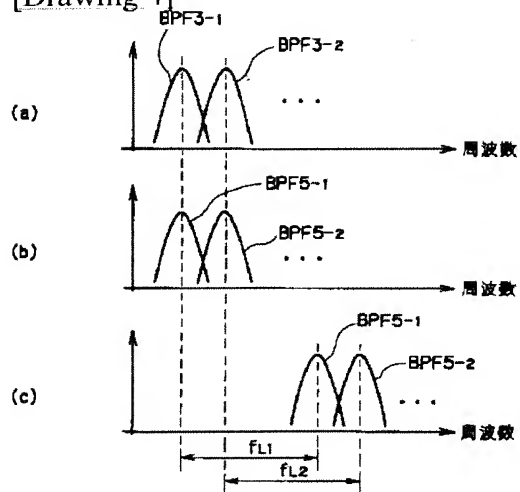
[Drawing 2]



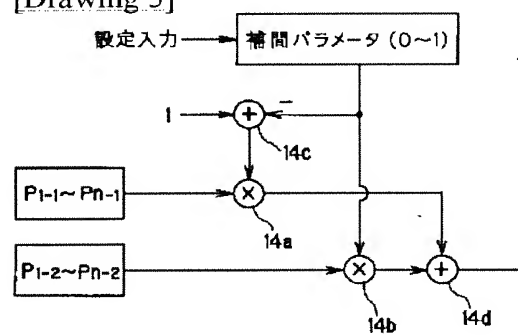
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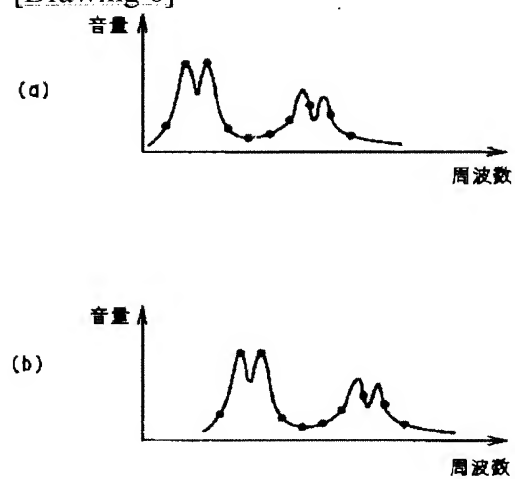
[Drawing 4]



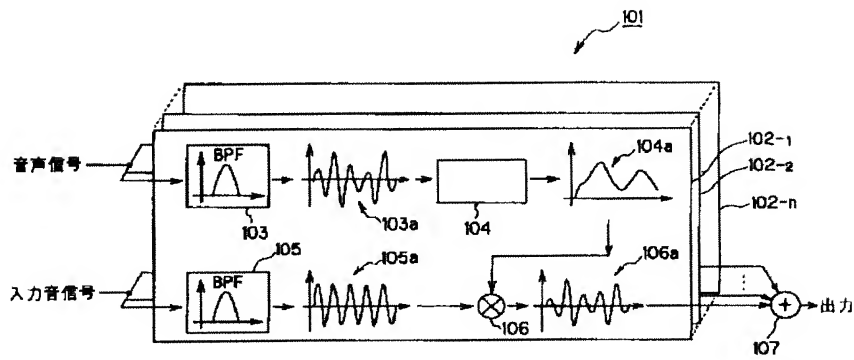
[Drawing 5]



[Drawing 6]



[Drawing 7]



[Translation done.]

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審査請求 未請求 請求項の数4 OL (全 7 頁)

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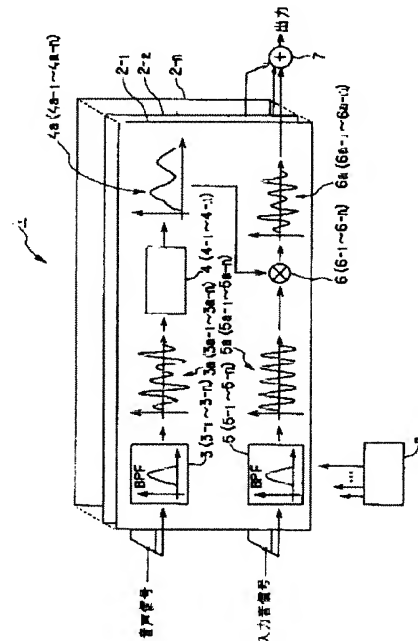
Fターム(参考) 5D378 B322 B323 FF07 FF19 KK01
KK02 KK06 XX14 XX16 XX24
XX26

(54) 【発明の名称】 効果付加装置

(57) 【要約】

【課題】 簡単な操作で、出力信号の音程を変化させることのできる効果付加装置を提供することが課題である。

【解決手段】 音声信号の所望の周波数帯域の信号を取り出すＢＰＦ３と、該ＢＰＦ３で取り出された信号の振幅エンベロープを検出する振幅エンベロープ検出部４と、入力音信号の所望の周波数帯域の信号を取り出すＢＰＦ５と、該ＢＰＦ５で検出された信号を振幅エンベロープで変調する乗算器６とを有する。更に、ＢＰＦ５の周波数帯域特性を変化させるためのパラメータ設定部８を具備し、該パラメータ設定部８では、予め設定した第１のパラメータと第２のパラメータとに基づき、補間処理により、ＢＰＦ５のパラメータを設定する。これにより、ＢＰＦ５の周波数帯域特性を一定の範囲で変化させることができ、この操作により、効果付加装置１の出力信号の音程を変更することが可能となる。



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【特許請求の範囲】

【請求項1】 音声信号及び入力音信号を入力し、前記音声信号の振幅エンベロープで前記入力音信号を変調することにより、前記入力音信号に所望の効果を付加する効果付加装置において、

複数のフィルタ手段を具備し、各フィルタ手段は、各フィルタ手段毎に異なる周波数帯域特性を有し、前記音声信号の所望の周波数帯域成分を取り出す音声信号用バンドパスフィルタと、

各フィルタ手段毎に異なる周波数帯域特性を有し、前記入力音信号の所望の周波数帯域成分を取り出す入力音信号用バンドパスフィルタと、

前記音声信号用バンドパスフィルタの出力信号から、音声信号の振幅エンベロープを検出する振幅エンベロープ検出手段と、

前記入力音信号用バンドパスフィルタの出力信号を、前記振幅エンベロープ検出手段で検出された振幅エンベロープで変調する変調手段と、

を具備し、更に、

前記各フィルタ手段に搭載される前記入力音信号用バンドパスフィルタの周波数帯域特性を決定するためのパラメータを設定するパラメータ設定手段と、

前記各フィルタ手段に搭載される前記変調手段より出力される信号を加算する加算手段と、

を備えたことを特徴とする効果付加装置。

【請求項2】 前記パラメータ設定手段は、複数のパラメータを具備し、各パラメータを択一的選択して前記入力音信号用バンドパスフィルタの周波数帯域特性を決定することを特徴とする請求項1に記載の効果付加装置。

【請求項3】 前記パラメータ設定手段は、複数のパラメータと、各パラメータどうしを補間する補間手段とを具備し、前記各パラメータを補間処理して所望のパラメータを設定し、前記入力音信号用バンドパスフィルタの周波数帯域特性を決定することを特徴とする請求項1に記載の効果付加装置。

【請求項4】 前記入力音信号は、楽器音、効果音、動物の鳴き声のうちのいずれかであることを特徴とする請求項1～請求項3のいずれか1項に記載の効果付加装置。

【発明の詳細な説明】**【0001】**

【発明の属する技術分野】本発明は、人間が発声した音声信号の特性を検出し、この検出信号により楽器等より得られる信号を変調することにより、この楽器があたかも喋っているような効果を得るようにした効果付加装置に関する。

【0002】

【従来の技術】近年、電子楽器の機能が多様化する中で、楽器より得られる楽音信号（入力音信号）を、人間が発声する音声信号で変調することにより、楽音信号に

特殊な効果を付加して出力することのできる効果付加装置が考案され、実用に供されている。

【0003】例えば、楽音信号としてギターやピアノの音を入力し、また、人間がマイクに向かって「こんにちは」と発声すると、あたかも、ギターやピアノが「こんにちは」と発声したような楽音信号を得ることができるので、ライブ演奏やレコーディングの際に有用である。

【0004】図7は、従来より使用されている効果付加装置101の構成を示すブロック図であり、図示のようにこの効果付加装置101は、複数のフィルタ手段102（102-1、102-2、・・・、102-n）を具備している。

【0005】各フィルタ手段102は、入力される音声信号から所望の周波数帯域の信号を取り出すための、BPF（バンドパスフィルタ）103と、該BPF103の出力信号103aから振幅エンベロープを検出する振幅エンベロープ検出部104と、BPF103と同一の周波数帯域特性を有し、入力される楽音信号から所望の周波数帯域の信号を取り出すためのBPF105と、該BPF105の出力信号105aに振幅エンベロープ検出部104より出力される振幅エンベロープ104aを乗じる乗算器106と、を具備している。

【0006】各フィルタ手段102（102-1～102-n）に搭載されるBPF103は、それぞれ周波数帯域特性が異なるように設定されており、同様に、各フィルタ手段102に搭載されるBPF105は、それぞれ周波数帯域特性が異なるように設定されている。そして、各フィルタ手段102よりの出力信号は加算器107により全て加算されて、当該効果付加装置101の出力信号となる。そして、このような構成によれば、人間が発声した音声信号のエンベロープで楽器音の信号波形を変調することができるので、出力信号は発声音のホルマント特性（声道の共振周波数）を有することになり、あたかも楽器が喋っているような音色となる出力信号を得ることができる。

【0007】図6（a）は、人間が「あ」と発声したときに得られるホルマントの周波数特性の例を示す説明図であり、音声信号として「あ」を入力した場合には、同図に示す如くのホルマント特性を得ることができる。

【0008】ところが、上記した従来における効果付加装置においては、各フィルタ手段102に搭載されるBPF103（音声信号から所望周波数成分を取り出すためのフィルタ）と、BPF105（入力音信号から所望の周波数成分を取り出すためのフィルタ）とが同一の周波数帯域特性となるように設定されているので、出力音のホルマントの周波数特性は入力する音声信号のホルマントの周波数特性と略同一となり、ホルマントの周波数を上下させるという操作を行うことができない。即ち、図6（a）に示すホルマント特性を、周波数軸（横軸）に沿って上下させる操作を行うことができず、出力信号

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の周波数特性（音色、ホルマント）を変化させることができない。このため、入力音信号に対して効果を付加する際の多様性に乏しいという欠点があった。

【0009】

【発明が解決しようとする課題】上記したように、従来の効果付加装置101においては、各フィルタ手段102の、BPF103とBPF105の周波数帯域特性が同一に設定されているので、出力音の音程を変化させることができず、何とか出力音の音程を変化させたいという要望が高まっていた。

【0010】この発明はこのような従来の課題を解決するためになされたものであり、その目的とするところは、簡単な操作で出力音の音程を変化させることのできる効果付加装置を提供することにある。

【0011】

【課題を解決するための手段】上記目的を達成するため、本願請求項1に記載の発明は、音声信号及び入力音信号を入力し、前記音声信号の振幅エンベロープで前記入力音信号を変調することにより、前記入力音信号に所望の効果を付加する効果付加装置において、複数のフィルタ手段を具備し、各フィルタ手段は、各フィルタ手段毎に異なる周波数帯域特性を有し、前記音声信号の所望の周波数帯域成分を取り出す音声信号用バンドパスフィルタと、各フィルタ手段毎に異なる周波数帯域特性を有し、前記入力音信号の所望の周波数帯域成分を取り出す入力音信号用バンドパスフィルタと、前記音声信号用バンドパスフィルタの出力信号から、音声信号の振幅エンベロープを検出する振幅エンベロープ検出手段と、前記入力音信号用バンドパスフィルタの出力信号を、前記振幅エンベロープ検出手段で検出された振幅エンベロープで変調する変調手段と、を具備し、更に、前記各フィルタ手段に搭載される前記入力音信号用バンドパスフィルタの周波数帯域特性を決定するためのパラメータを設定するパラメータ設定手段と、前記各フィルタ手段に搭載される前記変調手段より出力される信号を加算する加算手段と、を備えたことが特徴である。

【0012】また、請求項2に記載の発明は、前記パラメータ設定手段は、複数のパラメータを具備し、各パラメータを択一的選択して前記入力音信号用バンドパスフィルタの周波数帯域特性を決定することを特徴とする。

【0013】請求項3に記載の発明は、前記パラメータ設定手段は、複数のパラメータと、各パラメータどうしを補間する補間手段とを具備し、前記各パラメータを補間処理して所望のパラメータを設定し、前記入力音信号用バンドパスフィルタの周波数帯域特性を決定することを特徴とする。請求項4に記載の発明は、前記入力音信号は、楽器音、効果音、動物の鳴き声のうちのいずれかであることを特徴とする。

【0014】上述の如く構成された本発明によれば、音声信号が入力されると、該音声信号の所望の周波数帯域

が音声信号用バンドパスフィルタ（BPF3）により取り出され、取り出された信号のエンベロープが検出される。他方、楽器音等の入力音信号が入力されると、該入力音信号の所望の周波数帯域が入力音信号用バンドパスフィルタ（BPF5）により取り出される。そして、BPF5の出力信号は、前記のエンベロープ信号により変調され、更に、各フィルタ手段における変調信号が加算手段にて加算され、当該効果付加装置の出力信号となる。

【0015】また、BPF5は、パラメータ設定手段により適宜パラメータを変更することができ、これにより該BPF5の周波数帯域特性を変化させることができるので、当該効果付加装置の出力信号の音程を変化させることができる。また、パラメータ設定手段に2種のパラメータを記憶させ、且つ、補間手段における補間処理によってBPF5のパラメータを設定するように構成すれば、BPF5の周波数帯域特性を連続的に変化させることができるようになる。

【0016】

【発明の実施の形態】以下、本発明の実施形態を図面に基づいて説明する。図1は、本発明が適用された効果付加装置の一実施形態の構成を示すブロック図である。同図に示すように、この効果付加装置1は、複数のフィルタ手段2（2-1、2-2、・・・、2-n）（例えば、n=18）を具備している。

【0017】各フィルタ手段2は、入力される音声信号から所望の周波数帯域の信号を取り出すための、BPF（音声信号用バンドパスフィルタ）3（3-1～3-n）と、該BPF3の出力信号3a（3a-1～3a-n）から振幅エンベロープを検出する振幅エンベロープ検出部4（4-1～4-n）と、BPF3と同一の周波数帯域特性を有し、入力される楽器音信号（入力音信号）から所望の周波数帯域の信号を取り出すためのBPF（入力音信号用バンドパスフィルタ）5（5-1～5-n）と、BPF5の出力信号5a（5a-1～5a-n）に振幅エンベロープ検出手段4より出力される振幅エンベロープ4a（4a-1～4a-n）を乗じる乗算器（変調手段）6（6-1～6-n）と、を具備している。

【0018】また、各フィルタ手段2（2-1～2-n）に搭載されるBPF3（3-1～3-n）は、それぞれ周波数帯域が異なるように設定されており、同様に、BPF5（5-1～5-n）は、それぞれ周波数帯域が異なるように設定されている。そして、BPF5（入力音信号用のBPF）には、該BPF5の周波数帯域特性を決定するパラメータを適宜変更するパラメータ設定部（パラメータ設定手段）8が接続されている。更に、各フィルタ手段2よりの出力信号は加算器（加算手段）7により全て加算されて、当該効果付加装置1の出力信号となる。

【0019】図2は、BPF5の具体的な構成を示す説明図であり、同図に示すようにこのBPF5は、4個の

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遅延素子11と、それぞれ係数 a_0 、 a_1 、 a_2 、 b_1 、 b_2 を有する5個の係数器12を具備している。そして、周知のように、各係数 a_0 、 a_1 、 a_2 、 b_1 、 b_2 （以下、これらの係数を総称してパラメータという）を変更することにより、BPF5の周波数特性を変化させることができる。即ち、上記したパラメータ設定部8では、このパラメータ（ a_0 、 a_1 、 a_2 、 b_1 、 b_2 ）を変化させる処理を行うことにより、BPF5の周波数帯域特性を適宜変化させる。

【0020】図3は、パラメータ設定部8の具体的な構成を示すブロック図である。同図に示すように、該パラメータ設定部8は、図1に示す各フィルタ手段2（2-1～2-n）に搭載されるBPF5（5-1～5-n）のパラメータを記憶するパラメータ記憶部13を具備し、該パラメータ記憶部13には、第1のパラメータ $P_{1-1} \sim P_{n-1}$ と、第2のパラメータ $P_{1-2} \sim P_{n-2}$ と、の2種のパラメータが記憶されている。つまり、BPF5-1に対して2種のパラメータ P_{1-1} 、 P_{1-2} が記憶され、BPF5-2に対して2種のパラメータ P_{2-1} 、 P_{2-2} が記憶され、以下同様に各BPF5に対して2種のパラメータが記憶されている。

【0021】そして、第1のパラメータ $P_{1-1} \sim P_{n-1}$ により前記BPF5（5-1～5-n）の係数（図2に示す係数）を決定すると、該BPF5は図1に示すBPF3の周波数帯域特性と同一の周波数帯域特性となるように設定され、第2のパラメータ $P_{1-2} \sim P_{n-2}$ によりBPF5（5-1～5-n）の係数を決定すると、BPF5は当該BPF5の周波数帯域特性を変化させる際の、最大となる周波数帯域特性となるように設定される。

【0022】これを図4を基に説明する。図4（a）は、各フィルタ手段2（2-1～2-n）に搭載されるBPF3（3-1～3-n）の、周波数帯域を示す特性図、同図（b）は、各フィルタ手段2（2-1～2-n）に搭載されるBPF5（5-1～5-n）のパラメータを第1のパラメータに設定したときの周波数帯域を示す特性図、同図（c）は、同第2のパラメータに設定したときの周波数帯域を示す特性図である。図4（a）～（c）から理解されるように、第1のパラメータに設定したときには、BPF3の周波数帯域特性とBPF5の周波数帯域特性とが一致しており、第2のパラメータに設定したときには、BPF5の周波数帯域特性は、BPF3の周波数帯域特性に対して高い周波数となる帯域に設定されることになる。

【0023】また、図3に示すように、パラメータ設定部8は、パラメータ補間部14を具備しており、該パラメータ補間部14は、パラメータ記憶部13に記憶された第1のパラメータ（ $P_{1-1} \sim P_{n-1}$ ）と第2のパラメータ（ $P_{1-2} \sim P_{n-2}$ ）とに基づいて、直線補間処理を行うことにより、第1のパラメータと第2のパラメータとの中間値となるパラメータを適宜設定することができ

る。なお、ここでの補間処理は、直線補間に限定されるものではない。

【0024】図5は、パラメータ補間部14の具体的な構成を示すブロック図であり、図示のように、該パラメータ補間部14は、乗算器14a、14b、及び加算器14c、14dを具備し、第1のパラメータ（ $P_{1-1} \sim P_{n-1}$ ）と第2のパラメータ（ $P_{1-2} \sim P_{n-2}$ ）とを直線補間処理することにより、これらの中間値となるパラメータ出力を得るものである。即ち、図5に示す補間パラメータを「0」から「1」の範囲で調整すれば、補間処理により得られるパラメータ出力は、第1のパラメータと第2のパラメータとの間で適宜変化することになる。換言すれば、BPF5の周波数帯域特性を、図4（b）に示す帯域と同図（c）に示す帯域との間（周波数 f_{L1} 、 f_{L2} 、・・・の範囲）で移動させることができる。

【0025】次に、上記のように構成された本実施形態に係る効果付加装置1の、動作について説明する。まず、初期設定として、図5に示す補間パラメータを「0」とすると、パラメータ補間部14よりのパラメータ出力は、第1のパラメータ $P_{1-1} \sim P_{n-1}$ となり、このパラメータでBPF5（5-1～5-n）の周波数帯域特性が決定される。即ち、図4（a）、（b）から理解されるように、BPF5（5-1～5-n）の周波数帯域特性は、BPF3（3-1～3-n）の周波数帯域特性と同一となる。

【0026】この状態で、当該効果付加装置1（図1参照）に音声信号、及び楽音信号（入力音信号）を入力すると、各フィルタ手段2（2-1～2-n）のBPF3（3-1～3-n）にて所望の周波数帯域の信号が取り出される。この出力信号3a（3a-1～3a-n）は、振幅エンベロープ検出手段4（4-1～4-n）に供給されるので、該振幅エンベロープ検出手段4からは、振幅エンベロープ4a（4a-1～4a-n）が出力される。

【0027】また、楽音信号は、BPF5（5-1～5-n）に入力されるので、該BPF5により所望の周波数帯域の信号が出力信号5a（5a-1～5a-n）として取り出される。そして、この出力信号5a及び振幅エンベロープ4aは、乗算器6（6-1～6-n）にて互いに乗じられるので、該乗算器6の出力信号6a（6a-1～6a-n）は、楽音信号を音声信号の振幅エンベロープで変調した如くの波形となる。

【0028】各フィルタ手段2（2-1～2-n）で得られる出力信号6aは、加算器7にて加算処理されるので、該加算器7より出力される信号は、音声信号のホルマントを有する楽音信号の波形となり、あたかも楽器が喋っているかのような出力信号を得ることができる。例えば、楽音信号としてギター音を入力し、音声信号として「こんにちは」と入力すると、あたかもギターが「こんにちは」と喋っている如くの出力信号を得ることができ

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る。

【0029】次いで、図5に示す補間パラメータを変化させると（「0」に設定していた補間パラメータを「1」に近づけると）、BPF5（5-1～5-n）の周波数帯域特性は、図4（c）に示したように周波数が高い方向へ移動することになる。これにより、各フィルタ手段2（2-1～2-n）より出力される信号は、それぞれより高い周波数帯域となるように変化する。

【0030】即ち、図5に示すパラメータ補間部14の、補間パラメータを、「0」と「1」との間で適宜調整することにより、パラメータ補間部14の出力信号は、第1のパラメータP1-1～Pn-1と第2のパラメータP1-2～Pn-2の間で変化することになり、BPF5（5-1～5-n）の周波数帯域特性は、図4（b）に示す帯域と同図（c）に示す帯域との間（周波数fL1、fL2、・・・の範囲）を移動する。従って、図6（a）に示した如くホルマントの周波数は、同図（b）に示すように周波数が移動し、出力音に付加されたホルマントが高くなる。

【0031】その結果、ギターが「こんにちは」と喋っている如くの音色を出力させ、且つ、このホルマントを変化させることができるようになる。

【0032】このようにして、本実施形態に係る効果付加装置1によれば、人間の発声による音声入力信号、及び、楽音信号（入力音信号）を入力することにより、あたかも楽器（ギターやピアノ）が喋っているような音色を得ることができる。更に、パラメータ補間部14における補間パラメータを適宜変更することにより、出力信号のホルマントの周波数を上下させることができ、出力信号へ付加するホルマントを変化させることができ、従来と比較してより多様性に富む効果付加処理が可能となる。

【0033】なお、上記した実施形態では、パラメータ記憶部13に、第1のパラメータ及び第2のパラメータの、2種のパラメータを設定し、これらの各パラメータに基づいて補間処理にてBPF5（5-1～5-n）のパラメータを設定する例について説明したが、本発明はこれに限定されるものではなく、パラメータ記憶部13に複数種のパラメータを記憶しておき、補間処理を行わず、切換操作で所望のパラメータを選択することにより出力信号のホルマントの周波数を上下させるように構成することも可能である。

【0034】また、上記実施形態では、入力音信号として、ギターやピアノ等の楽音信号を例に説明したが、本発明はこれに限定されるものではなく、効果音や動物の鳴き声等とすることも可能である。

【0035】

【発明の効果】以上説明したように、本発明の効果付加装置は、入力音信号用バンドパスフィルタ（BPF5）の周波数帯域特性を適宜調整することができるので、出力音の音程を変化させることができる。また、パラメータ記憶手段に2種のパラメータを記憶させておき、これらのパラメータに基づいて補間処理でパラメータをBPF5のパラメータを設定するようにすれば、BPF5の周波数帯域特性を連続的に変化させることができ、多様な効果付加処理が可能となる。

【図面の簡単な説明】

【図1】本発明の一実施形態に係る効果付加装置の構成を示すブロック図である。

【図2】バンドパスフィルタの具体的な構成を示す説明図である。

【図3】パラメータ設定部の詳細な構成を示すブロック図である。

【図4】BPF3、BPF5の帯域特性を示す説明図であり、（a）はBPF3、（b）はBPF5（第1のパラメータを選択した場合）、（c）はBPF5（第2のパラメータを選択した場合）をそれぞれ示す。

【図5】パラメータ補間部の詳細な構成を示す説明図である。

【図6】「あ」と発声したときのホルマントの周波数特性を示す説明図であり、（a）は第1のパラメータに設定したとき、（b）は、第2のパラメータを設定したときを示す。

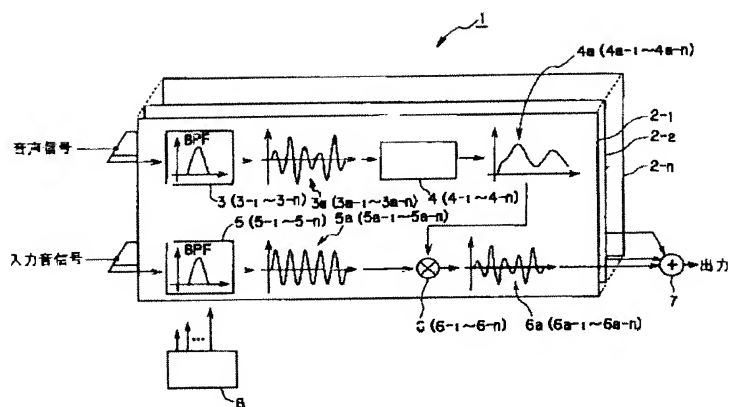
【図7】従来における効果付加装置の構成を示すブロック図である。

【符号の説明】

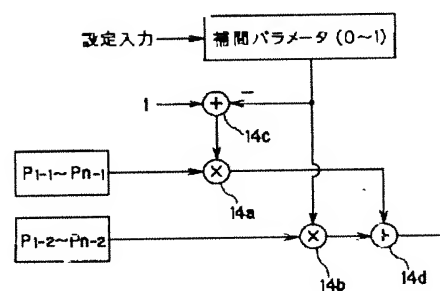
- 1 効果付加装置
- 2（2-1～2-n） フィルタ手段
- 3（3-1～3-n） BPF（音声信号用バンドパスフィルタ）
- 4（4-1～4-n） 振幅エンベロープ検出部（振幅エンベロープ検出手段）
- 5（5-1～5-n） BPF（入力音信号用バンドパスフィルタ）
- 6（6-1～6-n） 乗算器（変調手段）
- 7 加算器（加算手段）
- 8 パラメータ設定部（パラメータ設定手段）
- 11 遅延素子
- 12 係数器
- 13 パラメータ記憶部
- 14 パラメータ補間部
- 14a、14b 乗算器
- 14c、14d 加算器

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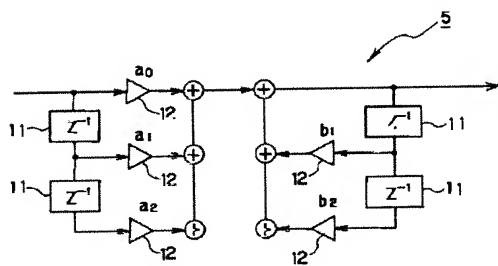
【図1】



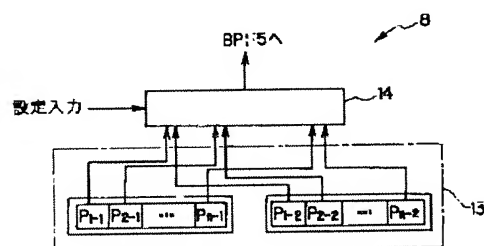
【図5】



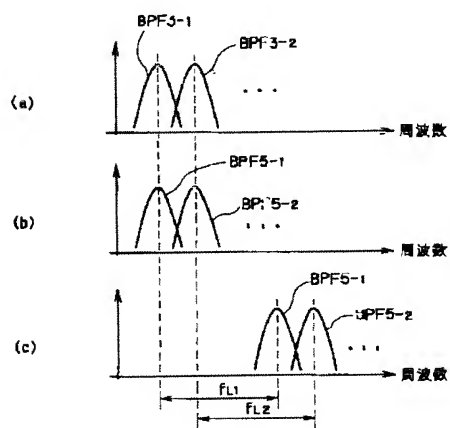
【図2】



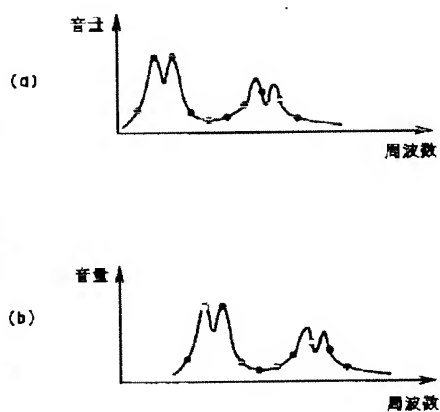
【図3】



【図4】



【図6】



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【図7】

